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EXAMINER	
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2672	7

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)
	09/537,849	SCOTT ET AL.
	Examiner	**Art Unit**
	Javid A Amini	2672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on ______ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) ______ is/are withdrawn from consideration.

5)☐ Claim(s) ______ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☒ Claim(s) *1-20* is/are objected to.

8)☐ Claim(s) ______ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on ______ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on ______ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ______ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 .
4) ☐ Interview Summary (PTO-413) Paper No(s). ______ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Response to Amendment

The amendment filed on March 03, 2003 under 37 CFR 1.131 has been considered.

Amendment to the claims:

List of claims:

Claim 1, (Amended): A method for georeferencing a raster map image, comprising [the steps of]: displaying a raster map and a georeferenced map; identifying image coordinates associated with at least two points on the raster map; identifying [geographically corresponding] geographic coordinates of points on the [raster map and on the] georeferenced map that correspond to the points identified on the raster map; and [associating an image coordinate of each point on the raster map with a geographic coordinate of the corresponding point on the georeferenced map;] determining a [functional] mathematical relationship between the image coordinates and the geographic coordinates[; and thereafter, for each additional corresponding points identified on the raster map and the georeferenced map, revising the functional relationship between the image coordinates and the geographic coordinates according to the additional corresponding points, and disregarding any points which are substantially inconsistent with the functional relationship].

Claim 2, (Amended): The method of claim 1, further comprising [the step of]: using the [functional] mathematical relationship to determine the geographic coordinates of [features] at least one feature on the raster map.

Claim 3, (Amended): The method of claim 1, further comprising [the step of]: storing the [functional] mathematical relationship with the raster map.

Claim 4, (Amended): The method of claim 1, further comprising [the step of]: [when] manipulating the raster map to display a location on the raster map [is manipulated by a user]; and updating the display of [manipulating] the georeferenced map [accordingly] to display a location identical to the location displayed on the raster map.

Claim 8, (Amended): The method of claim 1, wherein the [functional] mathematical relationship is represented by a set of general linear functions.

Claim 9, (Amended): [A computer system, having at least a processor connected to communicate with a readable and writeable memory] An apparatus for georeferencing a raster map image, comprising: means for displaying a raster map and a georeferenced map; means for identifying image coordinates associated with at least two points on the raster map: means for identifying [geographically corresponding] geographic coordinates of points on the [raster map and on the] georeferenced map that correspond to the points identified on the raster map; and [means for associating an image coordinate of the each point on the raster map with a geographic coordinate of the corresponding point on the georeferenced map;] means for determining a [functional] mathematical relationship between the image coordinates and the geographic coordinates[; and

for each additional corresponding points identified on the raster map and the georeferenced map, means for revising the functional relationship between the image coordinates and the geographic coordinates according to the additional corresponding points, and means for disregarding any points which are substantially inconsistent with the functional relationship].

Claim 10, (Amended): The [system] apparatus of claim 9, further comprising: means for using the [functional] mathematical relationship to determine the geographic coordinates [to features] of at least one feature on the raster map.

Claim 11, (Amended): The system of claim 9, further comprising: means for storing the [functional] mathematical relationship with the raster map.

Claim 12, (Amended): The [system] apparatus of claim 9, further comprising: means for manipulatincd, when] the raster map to display a location on the raster map [is manipulated by a userj, and means for updating the display of [manipulating] the georeferenced map [accordingly] to display a location identical to the location displayed on the raster map.

Claim 13, (Amended): The [system] apparatus of claim 9, wherein the geographic coordinates are latitude and longitude.

Claim 14, (Amended): The [system] apparatus of claim 9, wherein the raster map and the georeferenced map are displayed on the same computer display.

Claim 15, (Amended): The [system] apparatus of claim 9, wherein the corresponding points are marked by a user after visually determining geographically corresponding points.

Claim 16, (Amended): The [system] apparatus of claim 9, wherein the [functional] mathematical relationship is represented by a set of general linear functions.

Claim 17, (New): The method of claim 1 further comprising identifying image coordinates associated with at least one point on the raster map; identifying geographic coordinates of points on the georeferenced map that correspond to the point identified on the raster map; and revising the mathematical relationship.

Claim 18, (New): The method of claim 17, wherein revising further comprises disregarding any points previously identified that are substantially inconsistent with the mathematical relationship.

Claim 19, (New): The apparatus of claim 9 further comprising: means for identifying image coordinates associated with at least one point on the raster map; means for identifying geographic coordinates of points on the geogreferenced map that correspond to the point identified on the raster map; and means for revising the mathematical relationship.

Claim 20, (New) The apparatus of claim 19, wherein the means for revising further comprising means for disregarding any points previously identified that are substantially inconsistent with the mathematical relationship.

Amendment to the specification:

IN THE SPECIFICATION:

- The paragraph extending from page 13, line 17 to page 14, line 2, of the specification to read as follows:

When four or more georeferencing point-pairs are determined, the general linear georeferencing functions are over-determined. This means that more than the required amount of information to compute the general linear georeferencing functions is available, but that it is not, in general, completely consistent. The system [use] uses the extra information contained in the additional georeferencing points to provide validation checks to protect against the possibility that some of the data points may be inaccurate (step 430). Points that deviate excessively with respect to a calculated standard error are presumed to be inaccurate and are omitted from the calculation of the georeferencing functions. Note that as new points are added, the system also rechecks points previously marked as inconsistent, to determine if those points should now be considered when recomputing the georeferencing functions.

- The paragraph extending from page 21, line 20 to page 22, line 4, of the specification to read as follows:

These systems can be easily solved by well-known methods, such as Gaussian Elimination, or LU factorization. The solutions yield the desired values of β1, β2, β3 and β4 which in turn yield the desired values for a11, a12, a21, a22, b1, and b2.

- The first full paragraph on page 23 of the specification to read as follows:

Automatic Error Detection and Handling

When individual points are being assigned x, *y, Lon,* and Lat values, there is always a potential for error. To reduce the risk of incorrect georeferencing resulting from such errors, certain error handling procedures are built into the georeferencing process. The fundamental concept is that of detecting a "bad" point and then removing it from the set of active points, A[ ]. Note that removing a bad point from A will not delete the information associated with that point, but it will cause the georeferencing parameters to be completely uninfluenced by that point. We do not wish to remove the point entirely, since it may be determined at a later stage of the georeferencing that the point was not really bad at all, and should be used in the georeferencing calculation. This will be clarified shortly.

- The paragraph extending from page 23, line 21 to page 24, line 9, of the specification to read as follows:

Detecting Bad Points The following steps outline the bad point detection process using the general linear transform approach to georeferencing.

1. Begin by placing all existing points into the active set, A.
2. If there are fewer than five active points then you are done[].

Otherwise, for each of the currently active points in turn, move it (call it point k for the sake of convenience) temporarily out of the active set, and then calculate the resulting inverse georeferencing function (call it $g^{(k)}$) and its corresponding SSE_k. Also, calculate the difference between the predicted value and the actual value $\delta_k = | g^{(k)} (Lon_k, Lat_k)-(x_k, y_k)|$. *Make* a note of the values, δ_k and δ_k /SSE_k . Return point *k* to the active set (and move on to the next value of *k*).

- The first full paragraph on page 24 of the specification to read as follows:

3. From among the results found in step 2 above, find the point, k, with the largest value of δ_k /SSE_k which also satisfies $\delta_k /SSE_k > c1$ *and* $\delta_k > c1$ where *c1* and *c2* are some constants which are set according to the general level of accuracy to be expected on the particular type of map which is being georeferenced, the current number of active points, and the dots per inch of the scanned image. If there is such a point then mark it as bad (by removing it from the active set) and return to step 2 above. Otherwise you are done.

- The paragraph extending from page 24, line 22 to page 25, line 11, of the specification to read as follows:

There are several things to note about this procedure. One is that [it] allowing the values of c1 and c2 to change with the number of active points, makes it possible for the georeferencing system and method to utilize points which it might originally determine bad or inconsistent after a large enough sample of points has been gathered to make it clear that a lesser level of accuracy is all that can be achieved on this map. Another observation is that by using this procedure it is impossible to reduce the number of active points down to less than four (unless you started with less than 4 in which case this procedure does not apply at all). This scheme means that as each new point is added, all points determined so far are considered, even those [which] that had previously been marked bad. Thus early "misjudgements" on the part of the system can be corrected later, in light of new point information.

- The first full paragraph on page 25 of the specification to read as follows:

The same bad point detection process, can also be implemented using the rotational linear transform approach.In this case the method is capable of reducing the number of active points down to as low as three (rather than four for the general linear transform approach outlined above). This can be useful when dealing with small sets of active points.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim1 1-20 rejected under 35 U.S.C. 102(b) as being anticipated by Delorme et al.

1. As per claim 1, "a method for georeferencing a raster map image, comprising: displaying a raster map and a georeferenced map; identifying image coordinates associated with at least two points on the raster map; identifying geographic coordinates of points on the georeferenced map that correspond to the points identified on the raster map; and determining a mathematical relationship between the image coordinates and the geographic coordinates", Delorme discloses in Fig. 6, (first and second maps) a view of the CAMLS system with desktop PC or workstation programmed for printing strip maps or "trip tickets" showing proposed routes of travel from a point of origin to a destination. Delorme discloses in (col. 42, lines 34-51) conversion routines for raster data, symbols & annotations an array of conversion routines for conversion of raster data consisting of mapping graphics and related text, derived from input devices such as scanned in paper maps, message pads, digitizing tables, graphics and CAD programs, fax and wireless data transmissions into standard CAMLS data structures. The step of determining a mathematical relationship between the image coordinates and the geographic coordinates is inherent because a user marks the origin and the destination on the map.

2. As per claim 2, "the method of claim 1, further comprising: using the mathematical relationship to determine the geographic coordinates of at least one feature on the raster map",

the step is inherent because Delorme discloses in (col. 30, lines 37-55) Known programming techniques, which involve a process of matching the particulars of identified data structures with pre-defined criteria, are sufficient to enable CAMLS software to perform the reading and recognition tasks.

3. As per claim 3, "the method of claim 1, further comprising: storing the mathematical relationship with the raster map", Delorme discloses in (col. 1, lines 59-63) he geographical coordinate system located objects include user location, geographical destinations, and other selected geographical objects, from a set of databases stored in PDA/PC/EC memory devices or accessible through wired and wireless data communications links.

4. As per claim 4, "the method of claim 1, further comprising: manipulating the raster map to display a location on the raster map; and updating the display of the georeferenced map to display a location identical to the location displayed on the raster map", Delorme discloses in Fig. 6, a view of the CAMLS system with desktop PC or workstation programmed for printing strip maps or "trip tickets" showing proposed routes of travel from a point of origin to a destination.

5. As per claim 5, "the geographic coordinates are latitude and longitude", the step is inherent because two objects are in correlation, therefore, Delorme discloses in (col. 2, lines 25-35) The CAMLS system provides "intelligent" printed maps by direct computer output of computed mapping and travel location data on grid quadrangles for correlation with mapped surface features on the corresponding printed maps. This can be accomplished by human senses, e.g. visually and intuitively between human readable forms of the map without the necessity of

mentally or quantitatively determining latitude and longitude and without requiring any mathematical calculations by the user.

6. As per claim 6, “the raster map and the georeferenced map are displayed on the same computer display”, the step is inherent because Delorme illustrates in Fig. 6.

7. As per claim 7, “the corresponding points are marked by a user after visually determining geographically corresponding points”, Delorme illustrates in Fig. 1, and the boundary edges of the graphics display window 18 are formed with "hash marks" or subdivision marks 22 which further subdivide the selected grid quadrangle C3 on page 41. These hash marks or subdivision marks are also reproduced on the printed maps (not visible in Fig. 1) to further assist the user 12 in visually and intuitively determining his or her location with reference to the detailed mapping features depicted on the printed map.

8. As per claim 8, “the method of claim 1, wherein the mathematical relationship is represented by a set of general linear functions”, Delorme’ invention is involved a single dimension and also having a response (output) that is directly proportional to the input. These are considered as general linear function.

9. As per claim 9, “an apparatus for georeferencing a raster map image, comprising: means for displaying a raster map and a georeferenced map; means for identifying image coordinates associated with at least two points on the raster map: means for identifying geographic coordinates of points on the georeferenced map that correspond to the points identified on the raster map; and means for determining a mathematical relationship between the image coordinates and the geographic coordinates”, Delorme discloses in Fig. 6, (first and second maps) a view of the CAMLS system with desktop PC or workstation programmed for printing

strip maps or "trip tickets" showing proposed routes of travel from a point of origin to a destination. Delorme discloses in (col. 42, lines 34-51) conversion routines for raster data, symbols & annotations an array of conversion routines for conversion of raster data consisting of mapping graphics and related text, derived from input devices such as scanned in paper maps, message pads, digitizing tables, graphics and CAD programs, fax and wireless data transmissions into standard CAMLS data structures.

10. As per claim 10, “the apparatus of claim 9, further comprising: means for using the mathematical_relationship to determine the geographic coordinates of at least one feature on the raster map”, the step is inherent because Delorme discloses in (col. 30, lines 37-55) Known programming techniques, which involve a process of matching the particulars of identified data structures with pre-defined criteria, are sufficient to enable CAMLS software to perform the reading and recognition tasks.

11. As per claim 11, “the system of claim 9, further comprising: means for storing the mathematical relationship with the raster map”, Delorme discloses in (col. 1, lines 59-63) he geographical coordinate system located objects include user location, geographical destinations, and other selected geographical objects, from a set of databases stored in PDA/PC/EC memory devices or accessible through wired and wireless data communications links.

12. As per claim 12, “the apparatus of claim 9, further comprising: means for manipulating, the raster map to display a location on the raster map; and means for updating the display of the georeferenced map to display a location identical to the location displayed on the raster map”, Delorme illustrates in Fig. 1, and the boundary edges of the graphics display window 18 are formed with "hash marks" or subdivision marks 22 which further subdivide the selected grid

quadrangle C3 on page 41. These hash marks or subdivision marks are also reproduced on the printed maps (not visible in Fig. 1) to further assist the user 12 in visually and intuitively determining his or her location with reference to the detailed mapping features depicted on the printed map.

13. As per claim 13, "the apparatus of claim 9, wherein the geographic coordinates are latitude and longitude", the step is inherent because two objects are in correlation, therefore, Delorme discloses in (col. 2, lines 25-35) The CAMLS system provides "intelligent" printed maps by direct computer output of computed mapping and travel location data on grid quadrangles for correlation with mapped surface features on the corresponding printed maps. This can be accomplished by human senses, e.g. visually and intuitively between human readable forms of the map without the necessity of mentally or quantitatively determining latitude and longitude and without requiring any mathematical calculations by the user.

14. As per claim 14, "the apparatus of claim 9, wherein the raster map and the georeferenced map are displayed on the same computer display", the step is inherent because Delorme illustrates in Fig. 6.

15. As per claim 15, "the apparatus of claim 9, wherein the corresponding points are marked by a user after visually determining geographically corresponding points", Delorme illustrates in Fig. 1, and the boundary edges of the graphics display window 18 are formed with "hash marks" or subdivision marks 22 which further subdivide the selected grid quadrangle C3 on page 41. These hash marks or subdivision marks are also reproduced on the printed maps (not visible in Fig. 1) to further assist the user 12 in visually and intuitively determining his or her location with reference to the detailed mapping features depicted on the printed map.

16. As per claim 16, "the apparatus of claim 9, wherein the mathematical relationship is represented by a set of general linear functions", Delorme' invention is involved a single dimension and also having a response (output) that is directly proportional to the input. These are considered as general linear function.

17. Claim 17, "The method of claim 1 further comprising identifying image coordinates associated with at least one point on the raster map; identifying geographic coordinates of points on the georeferenced map that correspond to the point identified on the raster map; and revising the mathematical relationship", Delorme illustrates in Fig. 1, and the boundary edges of the graphics display window 18 are formed with "hash marks" or subdivision marks 22 which further subdivide the selected grid quadrangle C3 on page 41. These hash marks or subdivision marks are also reproduced on the printed maps (not visible in Fig. 1) to further assist the user 12 in visually and intuitively determining his or her location with reference to the detailed mapping features depicted on the printed map.

18. Claim 18, "The method of claim 17, wherein revising further comprises disregarding any points previously identified that are substantially inconsistent with the mathematical relationship", Delorme discloses in (col. 34, lines 21-23) many operations that prompt new grid display/output can be conveniently described in terms of naming the new grid then changing the display/output accordingly.

19. Claim 19, "The apparatus of claim 9 further comprising: means for identifying image coordinates associated with at least one point on the raster map; means for identifying geographic coordinates of points on the georeferenced map that correspond to the point identified on the raster map; and means for revising the mathematical relationship", Delorme

discloses in Fig. 6, a view of the CAMLS system with desktop PC or workstation programmed for printing strip maps or "trip tickets" showing proposed routes of travel from a point of origin to a destination. And the step of revising mathematical relationship is inherent because every point on the raster map contains a different geographic coordinates of points.

20. Claim 20, “the apparatus of claim 19, wherein the means for revising further comprising means for disregarding any points previously identified that are substantially inconsistent with the mathematical relationship”, Delorme discloses in (col. 34, lines 21-23) many operations that prompt new grid display/output can be conveniently described in terms of naming the new grid then changing the display/output accordingly.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Javid A Amini whose telephone number is 703-605-4248. The examiner can normally be reached on 8-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Michael Razavi can be reached on 703-305-4713. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-8705 for regular communications and 703-746-8705 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

Javid Amini
April 30, 2003

MICHAEL RAZAVI
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